

## PACKAGING BAG WITH ZIPPER

## BACKGROUND OF THE INVENTION

## Field of the Invention

The present invention relates to a packaging bag with a zipper.

## Description of the Related Art

A conventional packaging bag with zipper of this kind is known from Utility Model Registration No. 2557256, for example. In other words, a packaging bag is conventionally known wherein an openable and closable zipper which performs a male and female coupling action is provided at opposing positions of a bag in the vicinity of the opening end thereof, and in an integral fashion with the bag.

In a packaging bag of the kind disclosed in Utility Model Registration No. 2557256 described above, which comprises an integrally provided openable and closable zipper performing a male and female coupling action, before opening or closing the zipper, the perimeter of the bag is closed by heat sealing along the edge adjacent to the opening end of the bag, and when the zipper is opened and the contents of the bag are to be removed, the heat sealed section along the edge adjacent to the opening end of the bag is cut and discarded. In this state, the zipper is opened and the contents are removed.

Therefore, with a packaging bag with zipper such as that described above, the zipper is opened, and the contents removed, after cutting the heat seal section at the edge adjacent to the opening end of the bag, but during transportation of the product (a bag containing the

contents), or the like, the contents (liquid contents) may pass through small gaps in the male/female engaging section of the zipper, due to the pressure of the contents, or the like, and collect inbetween the zipper section and the heat seal section along the edge adjacent to the opening end of the bag, and if, in this state, the end consumer who has purchased the product cuts the heat seal portion along the edge adjacent to the opening end of the bag, in order to remove the contents, then the liquid contents that have collected between the zipper section and the heat seal section along the edge adjacent to the opening end of the bag will spill out.

#### SUMMARY OF THE INVENTION

The present invention was devised in order to resolve the aforementioned problem, an object thereof being to prevent contents from entering between the zipper section and the heat seal section along the edge adjacent to the opening end of the bag, during transportation, or the like.

In order to achieve this object, the present invention is devised as follows:

Provided by the present invention is a packaging bag with zipper, in which a male zipper tape and a female zipper tape are bonded to inner faces of respective front and rear side sheet sections, or rear and front side sheet sections, in the vicinity of the opening end of the bag. The upper end of the bag comes at the top when the bag is in an upright state. The opening end of the bag is located above a position where the zipper is disposed, and is closed by means of heat sealing. The respective zipper

tapes are bonded together in at least a region below the engaging section of the zipper tapes, out of regions above and below the same engaging section, with heat sealing strength of a degree that allows the zipper tapes to be manually peeled apart, by means of an interface peeling action, an interlayer peeling action, or a cohesive peeling action.

In the packaging bag with zipper, either one of the zipper tapes is made from a hot melt type adhesive resin, and the other zipper tape is made from a polyethylene type resin or a polypropylene type resin of the same kind as a material forming the inner layers of the bag.

In the packaging bag with zipper, both zipper tapes are made from a polyethylene type resin or polypropylene type resin of the same type as the material forming the inner layers of the bag, and a hot melt type adhesive resin section is provided on one of the zipper tapes at least in a bonding region formed by heat sealing below the engaging section of the zipper tapes.

In the packaging bag with zipper, one of the zipper tapes is made from a hot melt type adhesive resin, the outer face of the other zipper tape is made from a polyethylene type resin or polypropylene type resin of the same type as the material forming the inner layers of the bag, and the inner face of the other zipper tape is made from a polyethylene type resin or polypropylene type resin of a different type from the material forming the inner layers of the bag.

In the packaging bag with zipper, the inner faces of both zipper tapes are made from a polyethylene type resin

or polypropylene type resin, and a hot melt type adhesive resin section is provided on the inner face of one of the zipper tapes, at least in a bonding region formed by heat sealing in a position below the engaging section of the zipper tapes.

In the packaging bag with zipper, a hot melt type adhesive resin section which is to be bonded to the inner layer of the bag, is provided on the outer face of the zipper tape made from polyethylene type resin or polypropylene type resin.

In the packaging bag with zipper, both zipper tapes are made from a resin containing a material comprising a random mixture of a straight-chain low-density polyethylene type resin and a polybutene-1 resin.

In the packaging bag with zipper, a resin section containing a material comprising a random mixture of a straight-chain low-density polyethylene type resin and a polybutene-1 resin is provided on the inner faces of both zipper tapes, at least in the bonding region formed by heat sealing below the engaging section of the zipper tapes.

According to the foregoing, by closing and bonding two zipper tapes together by heat sealing in at least a position below the engaging section of the male zipper tape and the female zipper tape each bonded by heat sealing to the inner faces of the packaging bag in the vicinity of the opening end of the bag, liquid contents can be prevented from leaking via gaps in the engaging section between the zipper tapes. And no contents accumulate between the zipper section and the heat seal section along the edge of the opening end. By bonding together the two zipper tapes

with heat sealing strength of a degree that allows the zipper tapes to be manually peeled apart, in at least a position below the engaging section of the zipper tapes, by means of an interface peeling action, an interlayer peeling action or a cohesive peeling action. Then when the contents are to be taken out from the packaging bag, the heat sealed section along the edge adjacent to the opening end of the packaging bag is cut, and in this state, the bonding region between the zipper tapes can be peeled apart readily with user's fingers, and the contents can be removed from the packaging bag.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a packaging bag with zipper according to a first embodiment of the present invention;

Fig. 2 is an enlarged sectional view of a principal part of this packaging bag with zipper;

Fig. 3 is an enlarged sectional view of the principal part of this packaging bag with zipper, showing the bag in an open state;

Fig. 4 is an enlarged sectional view of a principal part of a packaging bag with zipper according to a second embodiment, showing the bag in an open state;

Fig. 5 is an enlarged sectional view of a principal part of a packaging bag with zipper according to a third embodiment, showing the bag in an open state; and

Fig. 6 is an enlarged sectional view of a principal part of a packaging bag with zipper according to a fourth embodiment, showing the bag in an open state.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 to Fig. 3 show a first embodiment of the present invention.

In Fig. 1 to Fig. 3, numeral 1 denotes a four-side seal type packaging bag, wherein a male zipper tape 4 and a female zipper tape 5 are bonded by heat sealing to the inner faces of respective sheet sections 2, 3 on the front side and rear side (or vice versa) of the bag in the vicinity of the opening end of the packaging bag 1.

The sheet sections 2, 3 forming the packaging bag 1 have a two-layer structure wherein the respective outer layers 2a, 3a are made from nylon film and the respective inner layers 2b, 3b are made from polyethylene film. The male zipper tape 4 and the female zipper tape 5 are bonded to the inner faces of the respective sheet sections 2, 3, in the vicinity of the opening end of the packaging bag 1 located at the upper end of the packaging bag 1 when the bag is in an upright state, and more specifically, in a position slightly below the upper end of the packaging bag 1, and these zipper tapes are fabricated from materials of the kinds described below.

For example, taking the material of the male zipper tape 4 as A and the material of the female zipper tape 5 as B, then A is a hot melt type adhesive resin and B is a polypropylene type resin, and a polyethylene type resin layer 6 and a hot melt type adhesive resin layer 7 are formed respectively by combined extrusion on the material A forming the male zipper tape 4 and material B forming the female zipper tape 5, on the faces thereof which oppose the inner faces 2b, 3b of the respective sheet sections 2, 3.

Thereupon, if the male zipper tape 4 and the female zipper tape 5 are heat sealed, respectively, onto the inner face of the sheet section 2 and the inner face of the sheet section, at a temperature of 180°C, for example, a sealing time of one second, and a sealing pressure of 20 N/cm<sup>2</sup>, then the polyethylene type resin layer 6 of the zipper tape 4 and the inner layer 2b of the polyethylene film of the sheet section 2 fuse together, and the hot melt type adhesive resin layer 7 of the zipper tape 5 fuses with the inner layer 3b of the polyethylene film of the sheet section 3. In this case, the polyethylene type resin layer 6 of the zipper tape 4 and the polyethylene film of the inner layer 2b of the sheet section 2 are of the same type and become completely fused together, and the hot melt type adhesive resin layer 7 of the zipper tape 5 and the polyethylene film of the inner layer 3b of the sheet section 3 are bonded together by a heat sealing strength of approximately 5 N/15 mm. In other words, it was found on the basis of experimentation, that the hot melt type adhesive resin has characteristics whereby, when heated, it bonds with polyolefin type resins, such as polyethylene, and has a heat sealing strength with polyolefin type resins of 5 N/15 mm or above.

Furthermore, in the packaging bag 1 with zipper according to the present embodiment, the respective zipper tapes 4, 5 are bonded together by heat sealing along a lower end in the width direction of the zipper portion when the packaging bag 1 is in an upright state, in such a manner that the zipper tapes can be peeled apart by an interface peeling action. Numeral 8 denotes the bonding

region between the zipper tapes 4, 5. Since the material of the zipper tape 4 is a hot melt type adhesive resin, and the material of the zipper tape 5 is a polypropylene type resin, then the heat sealing strength will be approximately the aforementioned figure of 5 N/15 mm. This heat sealing strength of approximately 5 N/15 mm is of a degree that allows the zipper tapes to be peeled apart readily by hand.

Furthermore, since the engaging section 9 of the male zipper tape 4 and the female zipper tape 5 would be deformed if heated ~~were applied thereto~~, only the end regions above and below the position of the zipper are heat sealed, by sandwiching them respectively between seal bars from the outer sides.

Various types of hot melt type adhesive resin are known, but in the present embodiment, it is possible to use, as a resin suitable for bonding the zipper tapes 4, 5 together in such a manner that they can be peeled apart by an interface peeling action, for example, a resin formed from a resin composition comprising at least one type of resin selected from a group comprising ethylene ethylacrylate copolymer comprising a main ingredient of ethylene vinyl acetate copolymer manufactured by Hirodine Corp., and petroleum resins, turpentine resins and rosin type resins.

Moreover, in the embodiment described above, the material of the male zipper tape 4 is stated as a hot melt type adhesive resin, and the material of the female zipper tape 5 is stated as a polypropylene type resin, but a reverse configuration is also possible. In this case, a hot melt type adhesive resin layer is formed on the male



zipper tape 4, and a polyethylene type resin layer is formed on the female zipper tape 5.

Furthermore, in the embodiment described above, the packaging bag 1 was a rectangular seal type bag, but it is also possible to apply it to a gusset type bag, butt-seam bag, standing pack type bag, or the like.

Contents are filled into the interior of the packaging bag 1 provided with a zipper as described above, and the filled opening of the packaging bag 1 is finally closed by heat sealing. Numeral 10 denotes the heat sealed section about the periphery of the packaging bag 1.

As described above, in the present embodiment, the respective zipper tapes 4, 5 are bonded together along the lower end in the width direction of the zipper portion when the packaging bag 1 is in an upright state, with a heat sealing strength of a degree that allows the zipper tapes to be peeled apart readily by hand, so that there will be no infiltration of liquid contents through gaps in the engaging section 9 between the zipper tapes 4, 5, during transportation, or the like.

Therefore, when the contents are to be removed from the packaging bag 1, by cutting and detaching the heat seal section 10 along the edge adjacent to the opening end of the packaging bag 1, and then opening the zipper in this state and peeling apart the bonding region 8 in the portion below the position of the zipper, by using one's fingers, it is possible to extract the contents from the packaging bag 1. The heat sealing strength of the bonding region 8 between the zipper tapes 4, 5 is approximately the same as the heat sealing strength between the inner face of the

packaging bag 1 and the female zipper tape 5 provided with a hot melt type adhesive resin layer 7 made from a polypropylene type resin as described above, but since the bonding region 8 is disposed in the end portion below the position of the zipper, then separation between the female zipper tape 5 and the packaging bag 1 is not liable to occur when the bonding region 8 below the zipper is peeled apart manually with the user's fingers. In the embodiment illustrated in the drawings, a bonding region 8 is provided between the zipper tapes 4, 5 in an end region below the position in which the zipper is disposed, but in addition to this bonding region 8, it is also possible to provide a bonding region between the zipper tapes 4, 5 in a position slightly below the end portion located above the zipper position.

Furthermore, in the embodiment described above, the two zipper tapes 4, 5 are bonded together in such a manner that they can be peeled apart by an interface peeling action, by a heat sealing strength of a degree which permits the tapes to be peeled apart manually, at a position below the engaging section 9 of the zipper tapes 4, 5, but it is also possible for them to be bonded on the basis of an interlayer peeling action or a cohesive peeling action. For example, as a hot melt type adhesive resin used for forming a cohesive peel, it would be suitable to use a resin having a polyolefin known as VMX (registered trademark) manufactured by Mitsubishi Chemical Corp. as a main ingredient, which comprises a polymer alloy of a multi-component polymer in which non-crystalline vinyl polymer is contained in a uniform manner in a polyolefin

resin which has been grafted with a radical polymerisation monomer, and a polymer in which styrene is dispersed in the dispersion phase of a polyolefin.

Furthermore, in the embodiment described above, the packaging bag 1 is made from a synthetic resin fabricated from sheet sections 2, 3 having a two-layer structure comprising nylon film in the outer layers 2a, 3a, and polyethylene film in the inner layers 2b, 3b, but the materials used are not limited in particular to these. In other words, provided that, at the least, a synthetic resin film such as a polyethylene film or a polypropylene film, or the like, is used to fabricate the inner layers, due to the requirements of heat sealing, it is possible to use a material other than a synthetic resin, such as aluminium foil, paper, rayon paper, or the like, as a material to be laminated on the outer sides of the inner layers.

Moreover, in the embodiment described above, in the male zipper tape 4 made from a hot melt type adhesive resin and the female zipper tape 5 made from a propylene type resin, a polyethylene type resin layer 6 and a hot melt type adhesive resin layer 7 are formed respectively on the faces opposing the inner layers 2b, 3b of the respective sheet sections 2, 3, but whilst the hot melt type adhesive resin layer 7 provided on the side of the female zipper tape 5 made from a polypropylene type resin is required, it is possible to omit the polyethylene type resin layer 6 provided on the side of the male zipper tape 4 made from a hot melt type adhesive resin. Moreover, it is also possible to make the male zipper tape or the female zipper tape from a hot melt type adhesive resin, and to make the

other zipper tape from a polyethylene type resin, and in this case, since the other zipper tape made from a polyethylene type resin is of the same type as the polyethylene film on the inner layer 3b of the sheet section 3, it will fuse completely with same, and the zipper tape made from a hot melt type adhesive resin and the polyethylene film on the inner layer 4b of the sheet section 4 will be bonded together by a heat sealing strength of approximately 5 N/15 mm, similarly to the embodiment described above. Moreover, the heat sealing strength between the zipper tapes may also be approximately 5 N/15 mm, and the two zipper tapes may be bonded together on the basis of an interface peeling action, as in the embodiment described above, or a interlayer peeling action, or a cohesive peeling action. Furthermore, a composition may also be adopted wherein one of the zipper tapes is made from a hot melt type adhesive resin, and the outer face of the other zipper tape is made from a polyethylene type resin, whilst the inner face thereof is made from a polypropylene type resin which is different to the material forming the inner layer of the packaging bag 1.

Furthermore, in the embodiment described above, the zipper tapes 4, 5 are bonded by heat sealing to the inner faces of the respective sheet sections 2, 3 of the packaging bag 1, but it is also possible for the two zipper tapes 4, 5 to be installed on the inner faces of the respective sheet sections 2, 3 of the packaging bag 1 by being laid respectively over the inner faces of the sheet sections 2, 3 of the packaging bag 1 in a sheet state, and

bonded to same, whilst the zipper tapes 4, 5 are in a molten state directly after molten extrusion.

Fig. 4 shows a second embodiment of the present invention.

The second embodiment shown in Fig. 4 is a modification of the first embodiment shown in Fig. 1. to 3, and whereas in the first embodiment, the male zipper tape 4 and the hot melt type adhesive resin layer 7 provided on the outer face side of the female zipper tape 5 are made entirely of a hot melt type adhesive resin, in this second embodiment, the male zipper tape 4 is made from a polyethylene type resin of the same type as the inner layer 2b of the packaging bag 1, and the female zipper tape 5 is made from a polypropylene type resin, a section 11 made from a hot melt type adhesive resin being provided on the inner face of the male zipper tape 4, in the vicinity of the bonding region 8 of the two zipper tapes 4, 5, and a section 12 made from a hot melt type adhesive resin being provided on the entire outer face side of the female zipper tape 5. It is also possible to provide a section made from a polyethylene type resin of the same type as the inner layer 3b of the packaging bag 1, instead of the section 12 made from a hot melt type adhesive resin. Even if a section of a hot melt type adhesive resin is provided in the minimum necessary area at a position below the engaging section 9 of the zipper tapes 4, 5 in this way, similar effects to those of the first embodiment described above are still obtained. In this embodiment, if the male zipper tape 4 is made from a hot melt type adhesive resin, then

the section 11 made from a hot melt type adhesive resin becomes unnecessary.

Fig. 5 shows a third embodiment of the present invention.

In the third embodiment shown in Fig. 5, the male zipper tape 4 and the female zipper tape 5 are both made from a polyethylene type resin of the same type as forming the inner layers 2b, 3b of the packaging bag 1, and a section 13 made from a hot melt type adhesive resin is provided on the inner face of the female zipper tape 5, only in the vicinity of the bonding region 8 of the zipper tapes 4, 5.

Furthermore, both the zipper tapes 4, 5 are made from a resin containing a random mixture of a straight-chain type low-density polyethylene resin and a polybutene-1 resin, for example, as means for bonding the zipper tapes 4, 5 together in a readily peelable manner, in a position below the engaging section 9, with heat sealing strength of a degree that allows the zipper tapes to be manually peeled apart. Thus, the bonding region 8 along the lower end section of the zipper tapes 4, 5 fabricated from the foregoing material will not couple completely, and hence it will be possible to peel apart the bonding region 8 of the zipper tapes 4, 5, readily and manually, by means of a cohesive peeling action.

Fig. 6 shows a fourth embodiment of the present invention.

In the fourth embodiment shown in Fig. 6, both of the zipper tapes 4, 5 are made from a polyethylene type resin of the same type as forming the inner layers 2b, 3b of the

packaging bag 1, and resin sections 14, 15 containing a resin comprising a random mixture of a straight-chain low-density polyethylene type resin and a polybutene-1 resin are provided on the inner faces of the two zipper tapes 4, 5, at least in the vicinity of the bonding region 8 located below the engaging section 9 of the zipper tapes 4, 5. This also causes the bonding region 8 in the lower end section of the zipper tapes 4, 5 not to couple together completely, and hence it will be possible to peel apart the bonding region 8 of the zipper tapes 4, 5 readily and manually by means of a cohesive peeling action.

In the embodiment illustrated in the drawings, the respective zipper tapes 4, 5 may have a structure comprising three or more layers. In other words, it is possible to interpose between the inner face and the outer face of the zipper tapes 4, 5, by using an adhesive resin, a material other than a polyethylene type resin or a polypropylene type resin, a hot melt type adhesive resin, or a resin containing a random mixture of a straight-chain type low-density polyethylene type resin and a polybutene-1 resin.

Furthermore, in the foregoing description, the bonding region 9 of the zipper tapes 4, 5 is bonded with a heat seal strength of approximately 5 N/15 mm, but it may be sufficient if the heat sealing strength is 1 N/15 mm or above.